State of Idaho
Department of Environmental Quality
Air Quality Division

AIR QUALITY PERMIT
STATEMENT OF BASIS

Permit to Construct No. P-2008.0093

Proposed for Public Comment

DF-AP #3, LLC

Double A Dairy Facility

Jerome, Idaho

Facility ID No. 053-00018

September 10, 2008

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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

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Acronyms, Units, and Chemical Nomenclature

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
bhp	brake horsepower
biogas	any gas fuel derived from the decay of organic matter, as the mixture of methane and carbon dioxide produced by the bacterial decomposition of sewage, manure, garbage, or plant crop
Btu	British thermal unit
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
gr	grain (1 lb = 7,000 grains)
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
gpm	gallons per minute
H_2S	hydrogen sulfide gas
HAP	Hazardous Air Pollutant
hp	horsepower
IC	internal combustion
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
m	meter(s)
MACT	Maximum Achievable Control Technology
$\mu g/m^3$	micrograms per cubic meter
MMBtu	million British thermal units
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
PC	permit condition
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	Synthetic Minor
SO_2	sulfur dioxide
SO_x	sulfur oxides
SI	Spark Ignited

TAP	Toxic Air Pollutant
T/yr	tons per year
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. FACILITY INFORMATION

1.1 Facility Description

DF-AP #3, LLC is proposing to construct an anaerobic digester operation at the Double A Dairy. Manure from the dairy will be pumped into the anaerobic digester where the naturally occurring digestion process will result in the production of biogas. Biogas will be collected from the anaerobic digester and used as fuel in six reciprocating IC engines used to power electrical generators. Prior to combustion in the IC engines the biogas will be passed through a bio-scrubber to decrease the concentration of H_2S in the biogas stream. The generators will produce electricity that will be sold to the local utility. During emergencies and routine maintenance the IC engines are taken offline and the excess biogas will be combusted in a flare at the facility. Prior to combustion in the flare the biogas will be passed through a bio-scrubber to decrease the concentration of H_2S in the biogas stream. Heat produced from the IC engines will be used to maintain the operating temperature in the digester and as process heat for the dairy.

The project includes the installation of the manure digester, a bio-scrubber, six reciprocating IC engines powering electrical generators, and an emergency flare which will all be operated by DF-AP #3, LLC. Double A Dairy will operate the existing dairy and manage the solids and wastewater generated by the process. Air emissions from the system are released through the six stacks associated with the IC engines and the stack for the emergency flare.

1.2 Permitting Action and Facility Permitting History

This permit is the initial PTC for this facility.

2. APPLICATION SCOPE AND APPLICATION CHRONOLOGY

2.1 Application Scope

DF-AP #3, LLC is proposing to construct an anaerobic digester operation at the existing Double A Dairy that will produce biogas from dairy cattle manure. The resulting biogas from the digester will be passed through a bio-scrubber to decrease the concentration of H_2S in the biogas stream and then combusted in six on-site IC engines, used to power electrical generators, or an emergency flare.

2.2 Application Chronology

May 30, 2008	DEQ Received 15-Day Pre-Permit to Construct Approval Application
June 13, 2008	DEQ approved a 15-Day Pre-Permit to Construct Application and declared the application complete
August 7, 2008	DEQ sent a draft PTC to the facility for review
September 20, 2008	Public Comment period was started
October XX, 2008	Public Comment period was ended
September XX, 2008	$XX PTC processing fee was received
October XX, 2008	Final permit and statement of basis were issued

3. TECHNICAL ANALYSIS

3.1 Emission Unit and Control Device

Table 3.1 EMISSION UNIT AND CONTROL DEVICE INFORMATION

Emission Unit/ID No.	Emissions Unit Description	Control Device Description	Emissions Discharge Point ID No. and/or Description
Anaerobic Digester	Capacity: 11.00 million gallons Throughput: 495,000 gallons per day Biogas production: 1,754,640 cubic feet per day	Gen-Tec H_2S bio-scrubber, six IC Engines (IC Engines No.'s 1, 2, 3,4,5, and 6), and a flare (FLARE)	N/A
IC Engine/IC-1	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Generating Capacity: 750 kW	Lean burn Combustion	EP-1
IC Engine/IC-2	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Generating Capacity: 750 kW	Lean burn Combustion	EP-2
IC Engine/IC-3	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Generating Capacity: 750 kW	Lean burn Combustion	EP-3
IC Engine/IC-4	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark	Lean burn Combustion	EP-4
IC Engine/IC-5	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Generating Capacity: 750 kW	Lean burn Combustion	EP-5
IC Engine/IC-6	Manufacturer: Guascor Model: SFGLD 560 Rated Power: 1,057 bhp Ignition Type: Spark Generating Capacity: 750 kW	Lean burn Combustion	EP-6
Emergency Flare/FLARE	Manufacturer: Andgar Corp. Model: N/A Rated Heat Input: 41.256 MMBtu/hr	N/A	FLARE STACK

3.2 Emissions Inventory

An emission inventory was developed for the six new IC engines and the flare (see Appendix B). Emissions estimates of criteria pollutant, TAP, and HAP PTE, as submitted by the facility (see Appendix C), were based upon the EPA RACT/BACTLAER Clearinghouse (RBLC), ID #IA-0088), Manufacturer's guarantees, and emission factors and process information specific to the facility.

Table 3.2 POST PROJECT UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_x		CO		VOC		Lead	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Sources Affected by the Permitting Action												
Guascor 560 (IC-1)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Guascor 560 (IC-2)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Guascor 560 (IC-3)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Guascor 560 (IC-4)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Guascor 560 (IC-5)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Guascor 560 (IC-6)[1]	0.07	0.30	0.51	2.25	2.32	10.18	3.73	16.32	2.32	10.18	N/A	N/A
Flare (FLARE)[2,3,4]	0.31	1.36	3.08	13.50	4.13	18.07	8.25	36.14	14.85	65.05	N/A	N/A
Post Project Totals[5]	**0.42**	**1.80**	**3.08**	**13.50**	**13.92**	**61.08**	**22.38**	**97.92**	**14.85**	**65.05**	**0**	**0**

[1] – Based on AP-42 Table 3.2-2 (7/00) for PM_{10} (including filterable and condensable) for 4-stroke lean-burn IC engines combusting natural gas and the Manufacturer's guarantee for SO_2, NO_x, CO and VOC.
[2] – PM_{10} emissions are based upon the EPA RACT/BACTLAER Clearinghouse (RBLC), ID #IA-0088.
[3] – SO_2 EF = 0.075 lb/ MMBtu per the Applicant (pg. 80 of the application)
[4] – NO_x, CO, and VOC emissions are based upon the EPA RACT/BACTLAER Clearinghouse (RBLC), ID #IA-0088.
[5] – The Post Project Totals are the worst-case emissions from either the total for the six IC engines or the flare (DEQ assumption for worst-case emissions).

Table 3.3 CHANGES IN EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NO_x		CO		VOC		Lead	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Sources Affected by the Permitting Action												
Pre-Project Totals	0	0	0	0	0	0	0	0	0	0	0	0
Post Project Totals	0.42	1.80	3.08	13.50	13.92	61.08	22.38	97.92	14.85	65.05	0	0
Facility Total Change in Emissions	**0.42**	**1.80**	**3.08**	**13.50**	**13.92**	**61.08**	**22.38**	**97.92**	**14.85**	**65.05**	**0**	**0**

Table 3.4 TAP AND HAP EMISSIONS SUMMARY

Toxic Air Pollutants	Total PTE for Units at the Facility[1]	Non-Carcinogenic Screening Emission Level[2]	Carcinogenic Screening Emission Level[3]	Exceed Screening Level
	(lb/hr)	(lb/hr)	(lb/hr)	(Y/N)
Acetaldehyde	2.2E-03	N/A	3.0E-03	N
Acrolein	1.1E-03	0.017	N/A	N
Benzene	2.8E-02	N/A	8.0E-04	Y
Dichloromethane	4.2E-03	N/A	1.6E-03	Y
Formaldehyde	7.8E-03	N/A	5.1E-04	Y
Nickel	8.3E-05	N/A	2.7E-05	Y
Selenium	4.5E-04	0.013	N/A	N
Styrene Monomer	2.2E-03	6.67	N/A	N
Toluene	1.1E-02	25	N/A	N
Trichloroethylene	8.3E-04	17.93	N/A	Y
Vinyl Chloride	2.3E-03	N/A	9.4E-04	Y
Xylene (o-, m-, p-isomers)	5.6E-03	29	N/A	N

[1] – The facility modeled total emissions separately for all six IC engines and the flare and presented the worst-case.
[2] – IDAPA 58.01.01.585, Screening Emission Levels
[3] – IDAPA 58.01.01.586, Screening Emission Levels

3.3 Ambient Air Quality Impact Analysis

The facility has demonstrated compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. **The facility has also demonstrated compliance to DEQ's satisfaction that emissions increase due to this permitting action will not exceed any AAC or AACC for TAPs.** A summary of the modeling analysis can be found in the modeling memo in Appendix B.

Table 3.5 FULL IMPACT ANALYSIS RESULTS FOR CRITERIA POLLUTANT(S)

Pollutant	Averaging Period	IC Engines Ambient Impact (µg/m3)[1]	Flare Ambient Impact (µg/m3)[1]	NAAQS (µg/m^3)	Percent of NAAQS (worst-case)
PM_{10}	24-hour	73.0	78.0	150	52.0%
	Annual	26	27	50	54.0%
NO_x	Annual	17	42.5	100	42.5%
SO_2	3-hr	34	118.4	1,300	9.1%
	24-hr	26	63.5	365	17.4%
	Annual	8	15.5	80	19.4%
CO	1-hour	3,600	4,280	40,000	10.7%
	8-hour	2,300	2,776	10,000	27.8%
Pb	Quarterly	N/A	N/A	1.5	N/A

[1] – Modeled impacts for primary pollutants considers background concentrations.
N/A: The emissions rate is below the modeling threshold; modeling is not required in accordance with State of Idaho Air Quality Modeling Guidance DEQ Publication, December 2002, or alternative threshold approved by DEQ Modeling Coordinator.

Table 3.6 FULL IMPACT ANALYSIS RESULTS FOR TAP(S)

Pollutant	Average Period	IC Engines Concentration ($\mu g/m^3$)	Flare Concentration ($\mu g/m^3$)	Regulatory AAC/AACC ($\mu g/m^3$)	Percent of Limit (worst-case)
Benzene	Annual	0.00	0.108	1.2E-01	90.0%
Dichloromethane	Annual	0.00	0.0158	2.4E-01	6.6%
Formaldehyde	Annual	0.00	0.0298	7.7E-02	38.7%
Nickel	Annual	0.00	0.000314	4.2E-03	7.5%
Trichloroethylene	Annual	0.00	0.00314	7.7E-01	0.4%
Vinyl Chloride	Annual	0.00	0.00879	1.4E-01	6.3%

Note: AACs are in units of milligrams per meter cubed whereas AACCs are in units of micrograms per meter cubed. Convert AACs from milligrams per meter cubed to micrograms per meter cubed.

4. REGULATORY REVIEW

4.1 Attainment Designation (40 CFR 81.313)

The DF-AP#3, LLC facility is located in Jerome County (AQCR 63), which is designated as in attainment for SO_2, unclassifiable/attainment for CO, $PM_{2.5}$, NO_x, and ozone and moderate non-attainment for PM_{10}, for federal and state criteria air pollutants. Reference 40 CFR 81.313.

4.2 Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201.....Permit to Construct Required

The facility's proposed project does not meet the permit to construct exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

4.3 Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.312.....Duty To Apply

The facility is not a Tier I source in accordance with IDAPA 58.01.01.006.113. Therefore, the requirements of IDAPA 58.01.01.312 do not apply.

4.4 Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

DF-AP#3, LLC is classified as a synthetic minor facility because without limits on the facility's potential to emit, SO_2 emissions have the potential to exceed major source thresholds. The use of a scrubber control device on the anaerobic digester is considered a synthetic minor limit used to demonstrate compliance with the major source threshold of SO_2. Therefore the AIRS classification is "SM."

4.5 PSD Classification (40 CFR 52.21)

DF-AP#3, LLC is classified as a PSD synthetic minor facility because with limits on the potential to emit, all emissions are less than PSD major source thresholds.

4.6 NSPS Applicability (40 CFR 60)

40 CFR 60, Subpart JJJJ.....Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

DF-AP#3, LLC is proposing to operate six 1,057 horsepower, NSPS non-certified, lean-burn, SI IC engines that exclusively combust biogas that is produced from an on-site anaerobic digester.

40 CFR 60.4230 .....Am I subject to this subpart?

DF-AP#3, LLC will commence construction after June 12, 2006, and the generators were manufactured after July 1, 2007 and have a capacity greater than 500 HP but less than 1,350 HP. Therefore, in accordance with 40 CFR 60.4230(a)(4)(i), 40 CFR 60, Subpart JJJJ is applicable to DF-AP#3 , LLC.

40 CFR 60.4231 .....What emission standards must I meet if I am a manufacturer of stationary spark ignited internal combustion engines?

DF-AP#3, LLC will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4232 .....How long must my engines meet the emission standards if I am a manufacturer of stationary SI internal combustion engines?

DF-AP#3, LLC will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4233 .....What emission standards must I meet if I am an owner or operator of a stationary SI internal combustion engine?

In accordance with 40 CFR 60.4233(e), as the owner and operator of the six SI lean-burn IC engines that combust digester gas and are greater than 75KW (100 bhp), DF-AP#3, LLC must comply with the emission standards in 40 CFR 60, Subpart JJJJ, Table 1 as summarized below in Table 4.1:

Table 4.1 40 CFR 60, SUBPART JJJJ, TABLE 1 SUMMARY

Engine Type and Fuel	Maximum Engine Horsepower (bhp)	Manufacture Date	Emission Standards[1]					
			g/bhp-hr			ppmvd at 15% O_2		
			NO_x	CO	VOC[2]	NO_x	CO	VOC[2]
Lean Burn Digester Gas Fired	500≥ BHP <1,350	1/1/2008	3.0	5.0	1.0	220	610	80

[1] – .. Owners and operators of stationary non-certified spark ignited IC engines may choose to comply with the emission standards in units of either g/bhp-hr **or** ppmvd at 15% O_2.

[2] – .. When calculating emissions of volatile organic compounds, emission of formaldehyde should not be included.

40 CFR 60.4234 .....How long must I meet the emission standards if I am an owner or operator of a stationary SI internal combustion engine?

As the owner and operator of six SI IC engines that combust digester gas, DF-AP#3, LLC must operate and maintain these engines to achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engines.

40 CFR 60.4235 .....What fuel requirements must I meet if I am an owner of operator of a stationary SI gasoline fired engine internal combustion engine subject to this subpart?

As the owner and operator of six SI IC engines that combust digester gas, DF-AP#3, LLC is not subject to this section of the rule.

40 CFR 60.4236 .....What is the deadline for importing or installing stationary SI ICE produced in the previous model year?

DF-AP#3, LLC will be installing their SI IC engines in the year 2008. Therefore, this section does not apply to DF-AP#3, LLC because the engines will be installed before the date specified in this section of the subpart.

40 CFR 60.4237 .....What are the monitoring requirements if I am an owner or operator of an emergency stationary SI internal combustion engine?

The IC engines that DF-AP#3, LLC will be installing will be used for primary electrical production and production of electricity that will be sold to the community electrical grid. These engines will not be used in "*emergencies*" as defined in 40 CFR 60.4248. Therefore, this section does not apply to the engines at this facility.

40 CFR 60.4238 .....What are my compliance requirements if I am a manufacturer of a stationary SI internal combustion engines ≤19KW (25HP).

DF-AP#3, LLC is an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. This section does not apply to this facility.

40 CFR 60.4239 .....What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines >19 KW (25HP) that use gasoline?

DF-AP#3, LLC will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4239 .....What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines >19KW (25HP) that use gasoline?

DF-AP#3, LLC will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4240 .....What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines >19KW (25HP) that are rich burn engines that use LPG?

DF-AP#3, LLC will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4241 .....What are my compliance requirements if I am a manufacturer of stationary SI internal combustion engines participating in the voluntary certification program?

DF-AP#3, LLC will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4242 .....What other requirements must I meet if I am a manufacturer of stationary SI internal combustion engines?

DF-AP#3, LLC will be an operator of the SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4243 .....What are my compliance requirements if I am an owner or operator of a stationary SI internal combustion engine?

DF-AP#3, LLC is the owner and operator of six SI IC engines, digester gas fired, non 40 CFR 60, Subpart JJJJ certified engines and must comply with standards specified in 40 CFR 60.4233(f). Each engine is rated at greater than 500 bhp. Therefore, DF-AP#3, LLC must keep a maintenance plan and records of conducted maintenance. In addition, DF-AP#3, LLC must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3-years, whichever comes first, in accordance with 40 CFR 60.4243(b)(2)(ii).

40 CFR 60.4243(g), does not apply to the six SI IC engines because the engines are not equipped with either a three-way catalyst or a non-selective catalytic reduction system. According to the preamble for 40 CFR 60, Subpart JJJJ in the Federal Register dated January 18, 2008, EPA expects that an air-to-fuel ratio controller will be operated only in the case of rich burn engines operating with a 3-way catalyst or non-selective catalytic reduction system. The Guascor model #SFGLD 560 SI IC engines are considered lean-burning engines because the manufacturer's recommended operating air/fuel ratio divided by the stoichiometric air/fuel ratio at full load conditions is greater than 1.1 in accordance with the definition of "Rich burn engine" of 40 CFR 60.4248.

Each engine is rated at greater than 500HP and was manufactured after July 1, 2007 and before July 1, 2008 but is not subject to 40 CFR 60.4233(b) or (c) because these engines are exclusively combusting digester gas and not gasoline or LPG fuels. Therefore, 40 CFR 60.4243(h) does not apply to the six SI IC engines proposed for this facility.

40 CFR 60.4244 ..... What test methods and other procedures must I use if I am an owner or operator of a stationary SI internal combustion engine?

According to 40 CFR 60.4243(b)(2)(ii) by reference of 40 CFR 60.4243(c), DF-AP#3, LLC is subject to conduct performance testing. This section specifies the performance test procedures that must be followed. 40 CFR 60, Subpart JJJJ, Table 2 specifies the methods and requirements for performance testing.

40 CFR 60.4245 ..... What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary SI internal combustion engine?

DF-AP#3, LLC is the owner and operator of six SI IC engines, which are digester gas-fired, non 40 CFR 60, Subpart JJJJ certified engines. This section specifies the notification and recordkeeping requirements. DF-AP#3, LLC shall submit all notifications and supporting documentation to EPA and DEQ in accordance with General Provision 7 and this section of 40 CFR 60, Subpart JJJJ.

40 CFR 60.4246 ..... What parts of the General Provisions apply to me?

Table 3 of 40 CFR 60, Subpart JJJJ specifies the applicable sections of 40 CFR 60, Appendix A - General Provisions.

40 CFR 60.4247 ..... What parts of the mobile source provisions apply to me if I am a manufacturer of stationary SI internal combustion engines?

DF-AP#3, LLC will be an operator of SI IC engines and not a "*Manufacturer*" by definition of 40 CFR 60.4248. Therefore, this section does not apply to this facility.

40 CFR 60.4248 ..... What definitions apply to this subpart?

This section contains definitions that are found throughout this subpart. This section generally applies to the facilities applicability to 40 CFR 60, Subpart JJJJ.4.6.

4.7 NESHAP Applicability (40 CFR 61)

DF-AP#3, LLC has not proposed to construct or install any equipment that is defined as an affected emissions unit by NESHAP regulations.

4.8 MACT Applicability (40 CFR 63)

No MACTs apply to this facility because it is a minor source of HAPs.

4.9 CAM Applicability (40 CFR 64)

DF-AP#3, LLC facility is not subject to CAM because it is not a major source.

4.10 Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

ANAEROBIC DIGESTER, BIO-SCRUBBER, IC ENGINES, AND FLARE

Permit Condition 2.3 establishes hourly and annual emissions limits for PM_{10}, SO_2, NO_x, CO, and VOC emissions from the six biogas-fired IC engines and the flare.

Permit Condition 2.4 establishes an average annual H_2S concentration limit for the biogas produced in the facility's on-site anaerobic digester. The H_2S limit has been established to limit the quantity of H_2S that is converted into the form of SO_2 during combustion in the IC engines and the flare, and it is based upon the Applicant's requested limit. This is because the concentration of H_2S is directly proportional to the SO_2 emissions rate. Compliance shall be demonstrated through Permit Conditions 2.19, 2.20, and 2.21.

Permit Condition 2.5 establishes the biogas production limit of 1,754,640 cubic feet per day. This limit is used to calculate the emission rate modeled to determine the 24 and annual concentration impact of PM_{10}, NO_x, SO_2, and CO to be 52.0, 54.0, 44.0, 9.5, 18.1, 20.0, 10.8, and 28.0% of NAAQS, respectively. Compliance shall be demonstrated through Permit Condition 2.18.

Permit Condition 2.6 establishes the NO_x emissions factor for the IC engines that can be determined through performance testing to assure that NO_x emissions do not exceed the major source threshold of 100 tons per year. Compliance shall be demonstrated through Permit Conditions 2.26 and 2.27.

Permit Condition 2.7 establishes the CO emissions factor for the IC engines that can be determined through performance testing to assure that CO emissions do not exceed the major source threshold of 100 tons per year. Compliance shall be demonstrated through Permit Conditions 2.26 and 2.27.

Permit Condition 2.8 establishes a 20% opacity limit for the IC engines' and flare stacks, vents, or functionally equivalent openings associated with the anaerobic digester, the IC engines, and the flare. Compliance shall be demonstrated through Permit Condition 2.24.

Permit Condition 2.9 establishes that the permittee shall not allow, suffer, cause, or permit the emission of odorous gasses, liquids, or solids to the atmosphere in such quantities as to cause air pollution.

Permit Conditions 2.10, 2.11, 2.26, 2.27, and 2.28 incorporate 40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. See section 4.6 "NSPS Applicability (40 CFR 60)" of this Statement of Basis for a detailed review.

Permit Condition 2.12 establishes that the biogas produced by the anaerobic digester shall be combusted in the SI IC engines or flared in order to prevent VOCs and H_2S gas from escaping into the atmosphere. This condition also establishes that the biogas cannot be combusted in the SI IC engines and the flare simultaneously since modeling was only performed for each scenario individually. Compliance shall be demonstrated through Permit Conditions 2.17 and 2.18.

Permit Condition 2.13 establishes that the digester flare shall have a pilot flame in order to assure proper operation of the flare. This permit condition is considered a reasonable condition in accordance with IDAPA 58.01.01.211.01.c. Compliance shall be demonstrated through permit conditions 2.17 and 2.20.

Permit Condition 2.14 establishes the operating parameters of the bio-scrubber that are required to ensure compliance with the SO_2 emissions limits specified in the permit. It was determined that for the proposed bio-scrubber monitoring of the temperature of the influent gas, temperature of the nutrient, the nutrient flow rate, and the pH of the nutrient solution were critical operating parameters. The operating parameters are based on the manufacturer's specifications.

Permit Condition 2.15 establishes the maintenance requirements of the bio-scrubber that are required to ensure proper operation. It was determined that for the proposed bio-scrubber the permittee shall maintain the influent gas thermometer, nutrient temperature thermometer, nutrient flow meters, and the nutrient pH meter. The maintenance requirements are based on the manufacturer's written instructions.

Permit Condition 2.16 establishes the inspection frequency and repair requirements of the bio-scrubber that are required to ensure proper operation. It was determined that for the proposed bio-scrubber the permittee shall annually inspect the bio-scrubber for physical degradation.

Permit Condition 2.17 establishes that the pilot flame must be monitored using a thermocouple or similar device.

Permit Condition 2.18 establishes that DF-AP#3, LLC shall monitor and record the amount of biogas being consumed. In the application the applicant stated that 1,754,640 cubic feet of biogas per day will be produced based on maximum design capacity of the digester. Since 1,754,640 cubic feet of biogas produced per day is what the emissions calculations are based on, Permit Condition 2.18 assures compliance with calculated emissions submitted within the application. Compliance shall be demonstrated through General Provision 7.

Permit Condition 2.19 establishes that DF-AP#3, LLC shall install a biogas flow rate meter and record biogas flow rates on a monthly basis. The biogas flow rates are monitored to assure SO_2 emissions are in compliance with the application. This condition is considered a reasonable condition per IDAPA 58.01.01.211.01.c. Compliance shall be demonstrated through General Provision 7.

In the future DF-AP#3, LLC may request to remove the biogas flow rate monitor by providing an uncontrolled emission inventory for each of the emission units along with a detailed description of the operation of the emission units and documentation of the generators control efficiency. DF-AP#3, LLC shall include at a minimum data demonstrating a weekly rolling consecutive 6-month average. If DF-AP#3, LLC proposes to use H_2S concentrations and SO_2 emissions from a similar plant to argue why the H_2S concentrations and SO_2 emissions are appropriate for use, they must be provided. At a minimum this information would include the following:

- Proof that the facilities are similar in design and processes (i.e. what are the emission unit specifications, what are the uncontrolled emissions, digester specifications, process material, etc.). A detailed description of the operation of each emission unit, including the digester, must be included.
- Proof that the digesters digest similar material in similar quantities.
- Proof that H_2S concentrations and SO_2 emissions are representative of the process material.

Permit Condition 2.20 establishes that DF-AP#3, LLC shall install a biogas H_2S concentration monitor and record biogas H_2S concentrations on a weekly basis. Weekly monitoring was chosen because of the cost of performing grab-sample analysis and the limited number of test that can be performed by the machine during its lifetime. The biogas H_2S concentrations are monitored and calculated using the mol-to-mol ratio to assure SO_2 emissions are in compliance with the application. This condition is considered a reasonable condition per IDAPA 58.01.01.211.01.c. Compliance shall be demonstrated through General Provision 7.

In addition, Permit Condition 2.20 establishes a monitoring schedule for H_2S concentration data. DF-AP#3, LLC may request to modify the H_2S flow rate monitoring schedule by providing data of monthly rolling consecutive 12-months results from the H_2S concentration monitor that were collected after initial operation of the anaerobic digester.

Permit Condition 2.21 establishes development of an Operations & Maintenance Manual (O&M Manual). The O&M Manual shall describe at a minimum the criteria listed in the permit condition. The purpose of the O&M Manual is to demonstrate that the anaerobic digester, the bio-scrubber, the IC engines, the flare, the H_2S gas concentration monitor, and the flow meters are in good working order and assures operation is as efficient as practical as described in the permit application.

Permit Condition 2.22 allows the permittee to establish alternative operating parameters for the anaerobic digester, the bio-scrubber, the IC engines No.1, No.2, No. 3, No. 4, No. 5, and No.6, and the flare based upon source testing instead of the manufacturer's specifications for each piece of equipment.

Permit Condition 2.23 establishes that generator engines No.1 thru No. 6 shall be operated in accordance with the manufacturer's specifications and recommendations in order to manage the formaldehyde emission that occurs as a result of combustion maintained below the AACC standard of 7.7E-02 $\mu g/m^3$ in IDAPA 58.01.01.586. Formaldehyde emissions are a result of incomplete combustion. In order to mitigate excess formaldehyde emissions and assure compliance with IDAPA 58.01.01.586 AACC concentrations, it is imperative that the generator engines are in good working order and assure operation is as efficient as practical.

Permit Condition 2.24 establishes that DF-AP#3, LLC shall conduct a monthly facility-wide inspection of potential sources of visible emissions.

Permit Condition 2.25 establishes that DF-AP#3, LLC shall maintain records of all odor complaints and corrective actions taken.

Permit Condition 2.26 establishes that DF-AP#3, LLC shall keep a maintenance plan and records of conducted maintenance and maintain and operate the engines in a manner consistent with good air pollution practices for minimizing emissions. In addition, DF-AP#3, LLC shall conduct an initial performance test and conduct subsequent performance testing every 8,760 hours of operation of the IC engines or every 3-years, whichever comes first. See section 4.6 "NSPS Applicability (40 CFR 60)" of this Statement of Basis for a detailed review.

Permit Condition 2.27 establishes the source test requirements per 40 CFR 60, Subpart JJJJ for demonstrating compliance with Permit Condition 2.24.

Permit Condition 2.28 establishes the notification, reporting, and record keeping requirements per 40 CFR 60, Subpart JJJJ.

Permit Condition 2.29 summarizes the applicable requirements of Subpart A of the New Source Performance Standards (NSPS, 40 CFR 60).

5. PERMIT FEES

Table 5.1 lists the processing fee associated with this permitting action. The facility is subject to a processing fee of $7,500.00 because its permitted annual change in emissions is 239.63 T/yr. Refer to the chronology for fee receipt dates.

Table 5.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
PM_{10}	1.80	0	4.70
SO_2	13.50	0	13.55
NO_x	61.08	0	61.26
CO	97.92	0	97.92
VOC	65.05	0	61.26
HAPS	0.28	0	0.0
Totals:	**239.63**	**0.00**	**239.63**
Fee Due	**$7,500.00 Based upon an annual increase in emissions of > 100 T/yr for a nonmajor new source**		

6. PUBLIC COMMENT

An opportunity for public comment period on the PTC application was provided from **June 26, 2008 to July 11, 2008** in accordance with IDAPA 58.01.01.209.01.c. During this time, there **WERE** comments on the application and there **WAS** a request for a public comment period on DEQ's proposed action.

Appendix A – AIRS Information

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Permittee/Facility Name:
Facility Location:
AIRS Number: **053-0018**

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	SM					SM		U
NO_x	B		B					U
CO	B		B					U
PM_{10}	B							U
PT (Particulate)	B							
VOC	B		B					U
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					
			A, JJJJ					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B – Emissions Inventory

IC Engines PTE Emissions Calculations:

For the natural gas-fired IC engines the Applicant has supplied the fuel consumption at full rated horsepower and the full rated horsepower of each IC engine. All six of the IC engines are identical, therefore the heat input to each engine is calculated as follows:

Fuel Use_{IC-X} (MMBtu/hr) = Fuel consumption (Btu/bhp-hr) x Rated Horsepower of IC engine IC-1 (bhp) ÷ 1,000,000 Btu/MMBtu

Fuel Use_{IC-X} MMBtu/hr = 6,505 Btu/bhp-hr x 1,057 bhp ÷ 1,000,000 Btu/MMBtu

Fuel Use_{IC-X} MMBtu/hr = 6.876 MMBtu/hr

Table A.1 IC ENGINE IC-1 THROUGH IC-6 HOURLY AND ANNUAL PTE FOR CRITERIA POLLUTANTS

Emissions Unit	Rated Heat Input (MMBtu/hr)	Annual Hours of Operation (hrs/yr)	Criteria Pollutant	Emissions Factors (lb/MMBtu)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)
IC-1 through IC-6[1]	6.876	8,760	PM_{10}	0.00999	0.07	0.30
			SO_2	0.0747	0.51	2.25
			NO_x	0.338	2.32	10.18
			CO	0.542	3.73	16.32
			VOC	0.338	2.32	10.18

[1] – Based on AP-42 Table 3.2-2 (7/00) for PM_{10} (including filterable and condensable) for 4-stroke lean-burn IC engines combusting natural gas and the Manufacturer's guarantee for SO_2, NO_x, CO and VOC.

Flare PTE Emissions Calculations:

Table A.2 FLARE FL HOURLY AND ANNUAL PTE FOR CRITERIA POLLUTANTS

Emissions Unit	Rated Heat Input (MMBtu/hr)	Annual Hours of Operation (hrs/yr)	Criteria Pollutant	Emissions Factors (lb/MMBtu)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)
Flare FL[1,2,3]	41.256	8,760	PM_{10}	0.00750	0.31	1.36
			SO_2	0.0747	3.08	13.50
			NO_x	0.100	4.13	18.07
			CO	0.200	8.25	36.14
			VOC	0.360	14.85	65.05

[1] – PM_{10} emissions are based upon the EPA RACT/BACTLAER Clearinghouse (RBLC), ID #IA-0088.
[2] – SO_2 EF = 0.075 lb/MMBtu per the Applicant (pg. 80 of the application)
[3] – NO_x, CO, and VOC emissions are based upon the EPA RACT/BACTLAER Clearinghouse (RBLC), ID #IA-0088.

Appendix C – Ambient Air Quality Impact Analysis

M E M O R A N D U M

DATE: September 8, 2008

TO: Darrin Pampaian, Air Quality Analyst, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT NUMBER: P-2008.0093

SUBJECT: Modeling Review for the DF-AP #3, LLC, Permit to Construct Application for an Anaerobic Digester Energy System on Lands Leased from the Double A Dairy near Jerome, Idaho

1.0 SUMMARY

DF-AP #3, LLC (DF-AP) submitted a Permit to Construct (PTC) application for an anaerobic digester and six Genset reciprocating internal combustion engines to be operated on land leased from the Double A Dairy, located near Jerome, Idaho. Air quality analyses involving atmospheric dispersion modeling of emissions associated with the proposed project were performed to demonstrate the new facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 [Idaho Air Rules Section 203.02]). Kleinfelder, DF-AP's consultant, performed the ambient air quality analyses submitted with the application and supplemental/corrective analyses submitted during the application review period.

A technical review of the submitted analyses was conducted by DEQ. The submitted information: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the proposed facility were below significant contribution levels (SCLs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all locations outside of the required setback distance (closest distance from pollutant emission points to the property boundary). Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
The generators and the flare may not operate simultaneously.	Combined impacts of the generators and the flare were not assessed.
August 28 and September 4, 2008, revisions increased the stack height of the engines to 8.84 meters.	The constructed emissions stacks must be at least 8.8 meters high.

2.0 BACKGROUND INFORMATION

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The DF-AP digester and generators will be located on land leased from the Double A Dairy, near Jerome, Idaho. The area is designated as attainment or unclassifiable for all criteria pollutants.

2.1.2 Significant and Full NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed new facility exceed the significant contribution levels (SCLs) of Idaho Air Rules Section 006.102, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and Idaho Air Rules Section 203.02. A cumulative NAAQS impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual[f]	1.0	50[g]	Maximum 1st highest[h]
	24-hour	5.0	150[i]	Maximum 6th highest[j]
$PM_{2.5}$[k]	Annual	Not established	15	Use PM_{10} as surrogate
	24-hour	Not established	35	Use PM_{10} as surrogate
Carbon monoxide (CO)	8-hour	500	10,000[l]	Maximum 2nd highest[h]
	1-hour	2,000	40,000[l]	Maximum 2nd highest[h]
Sulfur Dioxide (SO_2)	Annual	1.0	80[g]	Maximum 1st highest[h]
	24-hour	5	365[l]	Maximum 2nd highest[h]
	3-hour	25	1,300[l]	Maximum 2nd highest[h]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[g]	Maximum 1st highest[h]
Lead (Pb)	Quarterly	NA	1.5[i]	Maximum 1st highest[h]

[a]Idaho Air Rules Section 006.102
[b]Micrograms per cubic meter
[c]Idaho Air Rules Section 577 for criteria pollutants
[d]The maximum 1st highest modeled value is always used for the significant impact analysis or analyses using the model SCREEN3
[e]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f]The annual PM_{10} standard was revoked in 2006. The standard is still listed because compliance with the annual $PM_{2.5}$ standard is demonstrated by a PM_{10} analysis that demonstrates compliance with the revoked PM_{10} standard.
[g]Never expected to be exceeded in any calendar year
[h]Concentration at any modeled receptor
[i]Never expected to be exceeded more than once in any calendar year
[j]Concentration at any modeled receptor when using five years of meteorological data
[k]Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
[l]Not to be exceeded more than once per year

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been completed and promulgated into regulation. EPA has asserted through a policy memorandum that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard.

2.1.3 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permit requirements for toxic air pollutants from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.

Per Section 210, if the emissions increase associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated. If DEQ determines T-RACT is used to control emissions of carcinogenic TAPs, then modeled concentrations of 10 times the AACC are considered acceptable, as per Idaho Air Rules Section 210.12.

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Table 3 lists appropriate background concentrations for the Jerome, Idaho area.

Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations in these analyses were based on DEQ default values for rural/agricultural areas.

Table 3. Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
PM_{10}[b]	24-hour	73
	Annual	26
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO_2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO_2)	Annual	17
Lead (Pb)	Quarterly	0.03

a. Micrograms per cubic meter

b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3.0 MODELING IMPACT ASSESSMENT

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant to demonstrate compliance with applicable air quality standards.

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

3.1.1 Overview of Analyses

SCREEN3 was used for the air impact analyses. SCREEN3 generates maximum one-hour concentrations for a single source. Since there are six identical generators, impacts were evaluated by multiplying the emissions from one generator by six. The model was then run, using the stack characteristics associated with a single generator.

Persistence factors are used to convert one-hour concentrations from SCREEN3 output to concentrations associated with other averaging periods. The following are readily accepted persistence factors that were used (as specified in the *State of Idaho Air Quality Modeling Guideline*):

1-hour to 3-hour	0.9
1-hour to 8-hour	0.7
1-hour to 24-hour	0.4
1-hour to quarterly	0.13
1-hour to annual (criteria pollutants)	0.08
1-hour to annual (carcinogenic TAPs)	0.125 (specified by Idaho Air Rules)

The originally submitted analyses only considered impacts from the generators, not the flare. The flare was not included because it was considered as only operating during upset/emergency conditions. Upon further consideration it was determined the flare may operate occasionally during other periods. Kleinfelder then performed additional air impact analyses for the flare and submitted those to DEQ on July 30, 2008.

Revisions of the modeling were also submitted to DEQ on August 28, 2008, correcting an error in the modeling submitted in the original application. The original modeling only evaluated concentrations at the leased property boundary, rather than maximum concentrations at or beyond the leased property boundary. During the remodeling effort, Kleinfelder found that the generator stacks had to be raised by about one foot to enable compliance with the benzene AACC. An error found in the value entered in SCREEN3 for the total heat released per second for the flare was also corrected. Final revisions in the modeling analyses were submitted to DEQ on September 4, 2008.

Kleinfelder assessed pollutant impacts of four scenarios: 1) engines' impact on flat terrain; 2) engines' impact on the identified terrain feature; 3) flare impact on flat terrain; 4) flare impact on the identified terrain feature. Kleinfelder modeled each scenario using a 1.0 gram per second emissions rate to enable easy calculation of dispersion factors. Dispersion factors specify the maximum 1-hour impact per unit of emissions, and are calculated by dividing the SCREEN3 output maximum impact, in units of micrograms per cubic meter ($\mu g/m^3$), by the emissions rate used in the model (1.0 grams per second). Concentrations of specific pollutants are then calculated by multiplying the dispersion factor by the specific pollutant emissions rate in grams per second and the persistence factor for the averaging period of interest. This approach is valid because pollutant impacts vary linearly with emissions rates.

Table 4 provides a brief description of parameters used in the final submitted modeling analyses.

Table 4. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General facility location	Near Jerome	
Model	SCREEN3	
Meteorological data	Worst Case	Used the "Full Meteorology" option in SCREEN3
Terrain	Considered	Impacts to a nearby hill were assessed in SCREEN3
Building downwash	Considered	Building dimensions were input to SCREEN3
Receptor Grid	Automated distance	SCREEN3 determines the maximum concentration between two specified downwind distances

3.1.2 Modeling protocol and Methodology

Screening level air impact analyses were performed by Kleinfelder. A modeling protocol was submitted to DEQ prior to the application. Modeling was generally conducted using data and methods described in the protocol and/or in the *State of Idaho Air Quality Modeling Guideline*.

3.1.3 Model Selection

SCREEN3 was used for the air impact analyses. SCREEN3 is an acceptable model until EPA promulgates AERSCREEN as a replacement for SCREEN3.

3.1.4 Meteorological Data

SCREEN3 was run using the "Full Meteorology" option. The model uses an algorithm that generates worst-case meteorology for the specific source/receptor characteristics that results in highest concentrations.

3.1.5 Terrain Effects

A terrain feature was identified near the facility that could affect maximum modeled concentrations. Kleinfelder addressed this by selecting the complex terrain option in SCREEN3 to assess impacts on the terrain feature.

3.1.6 Facility Layout

Since SCREEN3 only assesses plume centerline concentrations in the horizontal dimension and only assesses single source impacts, the only critical facility layout criteria is the distance to the nearest ambient air boundary.

3.1.7 Building Downwash

Building downwash was considered in the analyses. Dimensions of the mechanical building were entered into SCREEN3 to allow the model to calculate how the structure will affect plume dispersion.

3.1.8 Ambient Air Boundary

DF-AP will lease property from Double A Dairy. The remaining property of the Double A Dairy was considered ambient air with regard to operations of the DF-AP facility. Kleinfelder stated the nearest distance between the generators and the boundary of the leased property is 110 feet (33.5 meters). This distance was used as the minimum distance at which air impacts were assessed. The distance between the engines or the flare and the ambient air boundary is not critical because maximum impacts predicted by SCREEN3 were well beyond the ambient air boundary.

3.1.9 Receptor Network and Generation of Setback Distances

Originally submitted modeling for the engines only assessed maximum impacts at the boundary of the leased property boundary, rather than maximum impacts at or beyond the leased property boundary. This was corrected through revised analyses received by DEQ on August 28 and September 4. To assure compliance with calculated maximum benzene emissions, the exhaust stacks were raised to 8.84 meters. The distance between the engines or the flare and the ambient air boundary is not critical because maximum impacts predicted by SCREEN3 were well beyond the ambient air boundary.

3.2 Emission Rates

Emissions rates used in the modeling analyses for the proposed project were equal to those presented in other sections of the permit application or the DEQ Statement of Basis.

3.2.1 Criteria Pollutant Emissions Rates

Table 5 provides criteria pollutant emissions rates used in the modeling analyses for short-term and long-term averaging periods. The flare and the engines will not operate simultaneously. Therefore, these sources were modeled separately as alternative operating scenarios.

Table 5. EMISSIONS RATES USED FOR FULL NAAQS IMPACT MODELING					
Emissions Point	**Description**	**Emissions Rates (lb/hr)**			
		PM_{10}[a]	**Sulfur Dioxide**	**Carbon Monoxide**	**Oxides of Nitrogen**
Engines	Total emissions from six generators	0.41	3.09	22.37	13.98
Flare	Flare emissions when generators are not operating	0.31	3.09	8.26	4.13

[a]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

3.2.2 TAP Emissions Rates

Table 6 provides TAP emissions associated with operation of the proposed project. The table only includes those TAPs having total emissions exceeding emissions screening levels (ELs) of Idaho Air Rules Section 585 and 586.

Table 6. EMISSIONS RATES USED FOR TAPS IMPACT MODELING			
TAP	**Averaging Period**	**Emissions Rates (lb/hr)**	
		Engines	**Flare**
Benzene	Annual	2.8E-2	2.8E-2
Dichloromethane	Annual	4.2E-3	4.2E-3
Formaldehyde	Annual	7.8E-3	7.8E-3
Nickel	Annual	8.3E-5	8.3E-5
Trichloroethylene	Annual	8.3E-4	8.3E-4
Vinyl chloride	Annual	2.3E-3	2.3E-3

3.3 Emission Release Parameters

Table 7 provides emissions release parameters used in the modeling analyses, including stack height, stack diameter, exhaust temperature, and exhaust velocity. All parameters appear to be within reasonably expected ranges, considering the type of sources. The air impact analyses initially submitted to DEQ used a stack height of 8.53 meters for the generators. When the modeling was later revised, the stack height was increased to 8.84 meters to enable compliance with the benzene AACC.

Table 7. EMISSIONS RELEASE PARAMETERS					
Point Sources					
Release Point	*Source Type*	*Stack Height (m)*[a]	*Modeled Diameter (m)*	*Stack Gas Temp. (K)*[b]	*Stack Gas Flow Velocity (m/sec)*[c]
Engines	Point	8.84	0.3048	630	30.18
Flare sources					
Release Point	**Source Type**	**Flare Stack Height (m)**	**Total Heat Release (cal/sec)[d]**		
Flare	Point	6.096	5.29E7		

[a]Meters
[b]Kelvin
[c]Meters per second
[d]Calories per second

3.4 Results for Full NAAQS Impact Analyses

Results of the SCREEN3 modeling, using the 1.0 gram per second emissions rate, are shown in Table 8. Impacts from the engines and flare on flat terrain were greater than all impacts to the identified terrain feature, and these results were used to generate the dispersion factors. Table 9 lists the maximum pollutant concentrations, calculated from the dispersion factor, pollutant specific emissions rates, and persistence factors for the averaging periods of interest.

Only the dispersion factor for the engines' impact on flat terrain was used to calculate impacts of PM_{10}, SO_2, CO, and NO_2. This was because the engines have equal or higher emissions of these pollutants than the flare and they have the largest dispersion factors.

Table 8. SCREEN3 MODEL RESULTS FOR 1.0 GRAM PER SECOND EMISSIONS

Scenario	Dispersion Factor[a] (µg/m³)	Maximum 1-Hour Impacts (µg/m³)				Location of Maximum Impact
		PM_{10}	SO_2	CO	NO_2	
Engines impact on flat terrain	241.2	12.5	93.8	680	319	65 m downwind
Engines impact on terrain feature	43.75	5.69	42.5	308	145	418 m downwind at +37 m elevation
Flare impact on flat terrain	54.84	2.14	21.3	57.1	21.4	60 m downwind
Flare impact on terrain feature	6.75	0.659	6.56	17.6	8.78	418 m downwind at +37 m elevation

[a]SCREEN3 maximum 1-hour output divided by the emissions rate used in the model (1.0 g/sec)
[b]Micrograms per cubic meter concentration per gram per second emissions
[c]Calculated by multiplying the emissions rate listed in Table 6 (in units of grams per second) by the dispersion factor
[d]NOx 1-hour impact was multiplied by 0.75 to estimate NO_2 impacts, per EPA guidance

Table 9. RESULTS FOR CUMULATIVE IMPACT ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration[a] (µg/m³)[b]	Background Concentration (µg/m³)	Total Ambient Impact (µg/m³)	NAAQS[c] (µg/m³)	Percent of NAAQS
PM_{10}[d]	24-hour	5.0	73	78.0	150	52
	Annual	1.0	26	27	50	54
Carbon monoxide (CO)	1-hour	680	3,600	4,280	40,000	11
	8-hour	476	2,300	2,776	10,000	28
Sulfur dioxide (SO_2)	3-hour	84.4	34	118.4	1,300	9
	24-hour	37.5	26	63.5	365	17
	Annual	7.5	8	15.5	80	19
Nitrogen dioxide (NO_2)	Annual	25.5	17	42.5	100	43

[a]Calculated by multiplying maximum 1-hour impacts from Table 8 by persistence factors listed in Section 3.1.1
[b]Micrograms per cubic meter
[c]National ambient air quality standards
[d]Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3.5 Results for TAPs Analyses

Kleinfelder performed TAPs impact analyses to evaluate compliance with applicable increments for those TAPs having emissions above screening levels of Idaho Air Rules Section 585 and 586. The dispersion factor for the engines' impact on flat terrain was used to calculate all TAP impacts because it is the largest dispersion factor and estimated TAP emissions for the engines and the flare are identical. Results of the TAPs impact analyses are provided in Table 10.

Table 9. RESULTS FOR TAP IMPACT ANALYSES			
Pollutant	**Averaging Period**	**Modeled Impact ($\mu g/m^3$)[a]**	**AAC/AACC[b] ($\mu g/m^3$)**
Benzene	Annual	0.108	0.12
Dichloromethane	Annual	0.0158	0.24
Formaldehyde	Annual	0.0298	0.077
Nickel	Annual	3.14E-4	4.2E-3
Trichloroethylene	Annual	3.14E-3	7.7E-1
Vinyl chloride	Annual	8.79E-3	1.4E-1

[a] Micrograms per cubic meter.
[b] Defined in Idaho Air Rules Section 585 and 586

4.0 CONCLUSIONS

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.

Appendix D – Facility Comments